wizSMART 2017

WERELDWIJDE WISKUNDE WEDSTRIJD W4KANGOEROE

THURSDAY MARCH 16TH 2017

WWW.W4KANGOEROE.NL

Good luck and most of all have fun.

© Stichting Wiskunde Kangoeroe

- calculators are not allowed
- you may use 50 minutes
- Only a pencil, an eraser and scribbling paper are allowed
- results and prizes will arrive at school in May
- answers will be posted on the website March 26th
- solutions will be posted on the website April 22th

wizSMART
7 & 8 primary school

1. 4 cards lie in a row like this:

| 2 | 0 | 1 | 7 |

Which row can you **not** obtain by only swapping 2 cards?

A. | 0 | 1 | 2 | 7 | **B.** | 0 | 2 | 1 | 7 | **C.** | 1 | 0 | 2 | 7 | **D.** | 2 | 0 | 7 | 1 | **E.** | 2 | 7 | 1 | 0 |
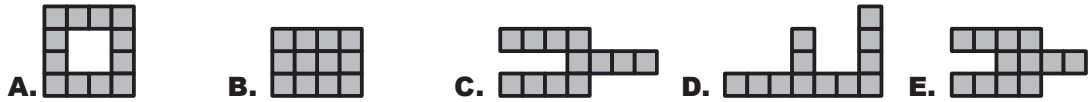
2. A fly has 6 legs and a spider has 8 legs.
3 flies and 2 spiders together have as many legs as 9 chickens and ...

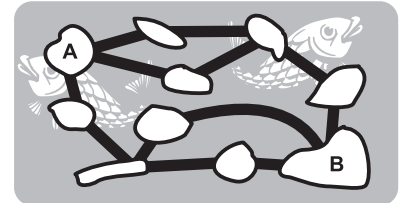**A.** 2 cats   **B.** 3 cats   **C.** 4 cats   **D.** 5 cats   **E.** 6 cats

3. *Alice* has 4 pieces like this:

Which picture can she **not** make from these 4 pieces?

A.   **B.**   **C.**   **D.**   **E.**

4. In some sea lie 10 islands.
These islands are connected by 12 bridges (see figure).
The minister wants to stop all traffic between island A and island B.

What is the smallest number of bridges he will have to close?

A. 1   **B.** 2   **C.** 3   **D.** 4   **E.** 5

5. Rhinos *Julia*, *Floor* and *Sanne* go for a walk.
Julia walks up front, *Floor* in the middle and *Sanne* walks behind.
Julia weighs 500 kg more than *Floor*.
Floor weighs 1000 kg less than *Sanne*.

Which of the following pictures shows the rhinos in the right order?

A.   **B.**

C.   **D.**

E.
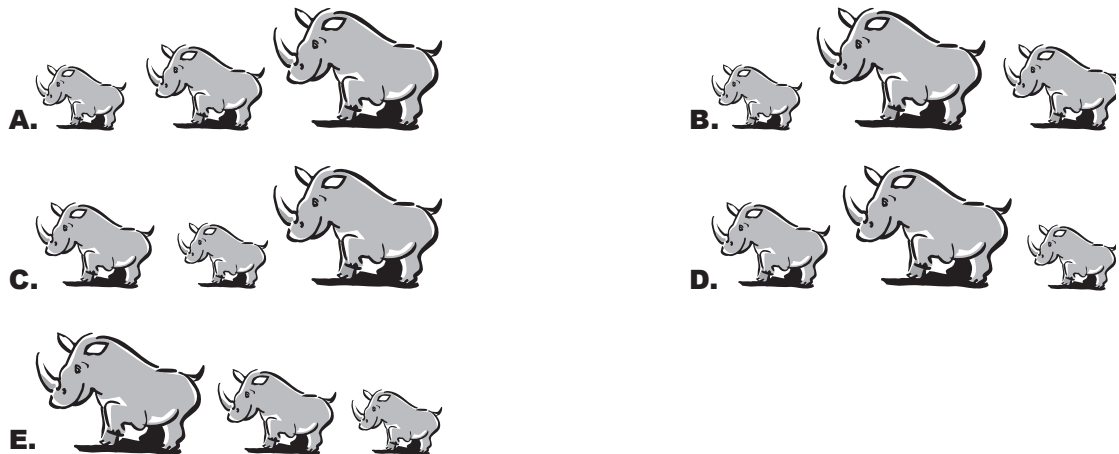
6. *Martin* will colour the squares of the rectangle (see figure).
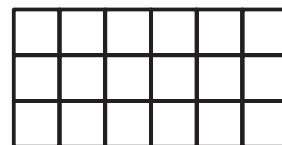
He colours $\frac{1}{3}$ of all squares blue and half of all squares yellow.
The remaining squares are coloured red.

How many squares does *Martin* colour red?

A. 1   **B.** 2   **C.** 3   **D.** 4   **E.** 5

7. *Peter* and *Nick* both participate in the Kangaroo contest.
Each time *Peter* has solved 2 problems, *Nick* has solved 3.
At the end the boys have solved 30 problems altogether.

How many problems did *Nick* solve more than *Peter*?

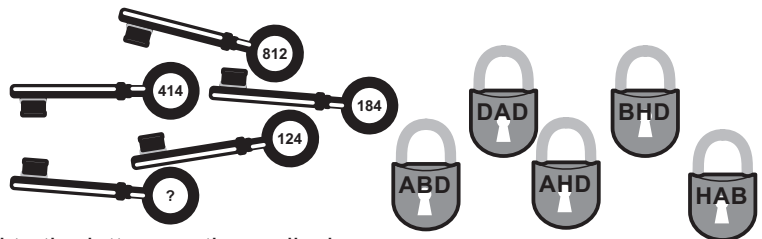**A.** 5   **B.** 6   **C.** 7   **D.** 8   **E.** 9

8. *Bob* folded a piece of paper.
Next he punches 1 hole in it.
Then he unfolds the paper again, see figure.
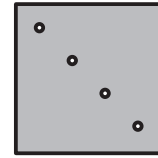
Which way did *Bob* fold the piece of paper?

A.   **B.**   **C.**   **D.**   **E.**

9. The 5 keys fit the 5 padlocks.

The numbers on the keys correspond to the letters on the padlocks.

Which number should be written on the padlock with the question mark?

A. 282   **B.** 284   **C.** 382   **D.** 823   **E.** 824

10. *Tom* writes in pencil the numbers from 1 to 20 in a row.
He obtains the 31-digit number 1234567891011121314151617181920.
Then he erases 24 of the digits.
This way he gets a 7-digit number.

What is the largest possible number *Tom* can get this way?

A. 7181920   **B.** 9567892   **C.** 9671819   **D.** 9781920   **E.** 9818192

11. The construction shown in the figure is made out of little cubes.
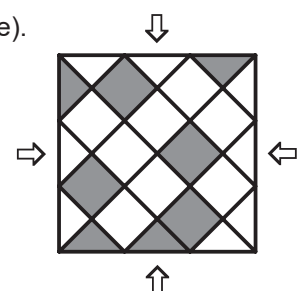The edges of these cubes are of length 1 cm.
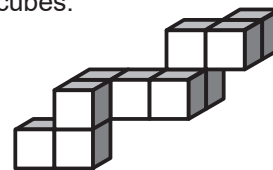
Morten wants to put the construction in a rectangular box, of which the sides have integral lengths in centimeters.

What are the measurements of the smallest box he can use?

A. 3 x 3 x 4   **B.** 3 x 4 x 5   **C.** 3 x 5 x 5   **D.** 4 x 4 x 4   **E.** 4 x 4 x 5

12. A square floor is tiled by triangular and square tiles in grey and white (see picture).

What is the smallest number of grey tiles to be swapped by white tiles,
such that the pattern looks the same from each side (as shown by the arrows)?

A. 3 triangles and 1 square   **B.** 1 triangle and 3 squares
C. 1 triangle and 1 square   **D.** 3 triangles and 3 squares
E. 3 triangles and 2 squares

13. 4 players of a handball team all scored a different number of goals in a match.
One of these 4, *Mike*, scored the least number of goals.
The other 3 players scored 20 goals in total.

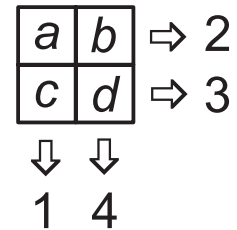What is the largest number of goals *Mike* could have scored?

A. 2   **B.** 3   **C.** 4   **D.** 5   **E.** 6

14. A special dice has a number on each of its 6 faces.
The sums of the 2 numbers on opposite faces are all equal.
5 of these numbers are 5, 6, 9, 11 and 14.

What is the sixth number on this dice?

A. 4   **B.** 7   **C.** 8   **D.** 13   **E.** 15

15. The letters *a*, *b*, *c* and *d* in the picture represent numbers.

$$\begin{array}{|c|c|} \hline a & b \\ \hline c & d \\ \hline \end{array} \Rightarrow \begin{array}{c} 2 \\ 3 \end{array}$$

$$\Downarrow \quad \Downarrow$$
$$1 \quad 4$$

We add the numbers in each row and in each column.
The results are shown behind the row or under the column (see picture).

Which statement is true?

A. *a* is equal to *d*   **B.** *b* is equal to *c*   **C.** *a* is greater than *d*
D. *a* is smaller than *d*   **E.** *c* is greater than *b*

16. *Peter* is going on a 5-day hike in the mountains.
He arrives on Monday and starts immediately.
The next days he wants to walk 2 km more than the day before.
The total distance of the hike is 70 km.

How many km will he have to walk on Thursday?

A. 12   **B.** 13   **C.** 14   **D.** 15   **E.** 16

17. A bag contains only red marbles and green marbles.
For any 5 marbles we pick from the bag at least 1 is red.
For any 6 marbles we pick from the bag at least 1 is green.

What is the largest number of marbles the bag can contain?

A. 7   **B.** 8   **C.** 9   **D.** 10   **E.** 11

18. *Boris* has an amount of money and 3 magic wands that he can use only once.
Wand A adds 1 euro to the amount.
Wand B subtracts 1 euro from the amount.
Wand C doubles the amount.

+1   -1   x2
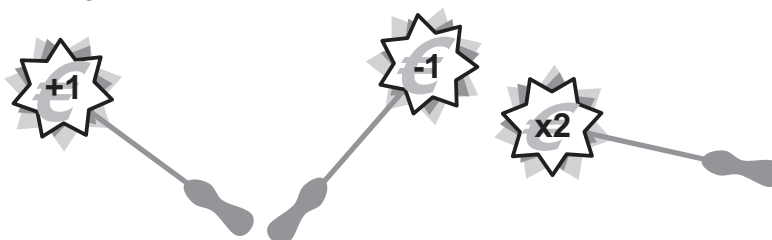
magic wand A   magic wand B   magic wand C

In which order should *Boris* use his wands to obtain the largest amount of money?

A. A-B-C   **B.** B-C-A   **C.** A-C-B   **D.** B-A-C   **E.** C-B-A

19. *Rafael* has put 3 squares on top of each other.
The first square has sides of length 2 cm.
The second square has sides of length 4 cm and 1 vertex is placed in the centre of the first square.
The third square has sides of length 6 cm and 1 vertex is placed in the centre of the second square. See figure.
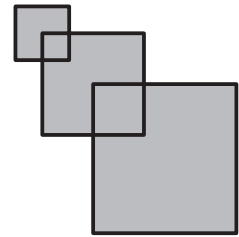
What is the area of the shape (figure)?

A. 6 cm²   **B.** 16 cm²   **C.** 27 cm²   **D.** 32 cm²   **E.** 51 cm²

20. A kangaroo is drawn in the first triangle (see figure).

Dotted lines indicate mirrors.
The first two reflections are shown.

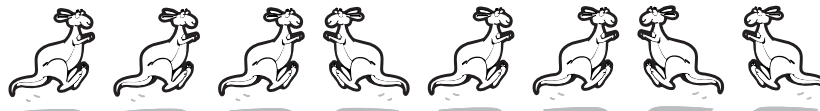What does the reflection in the shaded triangle look like?

A.   **B.**   **C.**   **D.**   **E.**

21. *Tess* has 9 bars as in the picture.

Which figure can she build from these 9 bars?

A.   **B.**   **C.**   **D.**   **E.**

22. 8 kangaroos are in a line as shown.

Jeroen exchanges the position of 2 kangaroos each time.
He does this only with kangaroos standing side by side and facing each other.
The direction the kangaroos are facing does not change.

After how many exchanges will there be no pair of kangaroos left facing each other?

A. 2   **B.** 10   **C.** 12   **D.** 13   **E.** 16

**23.** *John* wants to write a natural number greater than 0 in each box of the diagram shown.
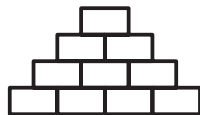
He does this in such a way that each number is the sum of the 2 numbers in the boxes immediately below it.

What is the largest number of odd numbers that *John* can write?

A. 4   **B.** 5   **C.** 6   **D.** 7   **E.** 8

24. *Julia* has 4 pencils of 4 different colours.
She wants to use some or all of these 4 colours to colour the map of an island, consisting of 4 countries (see figure).
2 countries sharing a border cannot get the same colour.
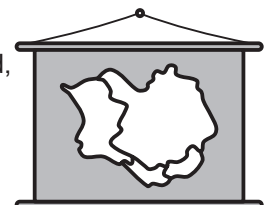
In how many ways can *Julia* colour the map?

A. 12   **B.** 18   **C.** 24   **D.** 36   **E.** 48